

[CLAIMS:

1. A channel estimation unit for obtaining channel estimates of data symbols from pilot symbols in a combined symbol sequence which has a plurality of slots and includes the data symbols and the pilot symbols, said channel estimation unit comprising:
- 5 means for locating the pilot symbols in the combined symbol sequence;
- 10 means for generating pilot blocks by extracting the pilot symbols from two or more slots in the combined symbol sequence in accordance with a located result; and
- 15 means for obtaining the channel estimates of the data symbols by calculating a weighted sum of averages of the pilot symbols in the individual pilot blocks,
- 20 wherein a magnitude of weighting differs between at least two data symbols in each slot.
2. A CDMA receiver which receives a combined symbol sequence that is spread, has a plurality of slots, and includes data symbols and pilot symbols, and which generates a data sequence, said CDMA receiver
- 25 comprising:
- means for receiving the spread combined symbol

sequence;

means for generating a combined symbol sequence
by despread the spread combined symbol sequence;

means for locating the pilot symbols in the
5 combined symbol sequence;

means for generating pilot blocks by extracting
the pilot symbols from two or more slots in the
combined symbol sequence in accordance with a
located result;

10 means for obtaining channel estimates of the
data symbols by calculating a weighted sum of
averages of the pilot symbols in the individual
pilot blocks;

means for obtaining a data symbol sequence by
15 eliminating the pilot symbols from the combined
symbol sequence in accordance with the located
result;

means for compensating for channel fluctuations
in the data symbol sequence by using the channel
20 estimates of the data symbols; and

means for generating the data sequence by
demodulating the data symbol sequence compensated
for,

wherein a magnitude of weighting differs between
25 at least two data symbols in each slot.

3. A CDMA transceiver including a transmitting processor and a receiving processor, said transmitting processor comprising:

means for generating a data symbol sequence by
5 modulating a data sequence;

means for generating a combined symbol sequence by inserting pilot symbols into the data symbol sequence;

means for generating a spread combined symbol
10 sequence by spreading the combined symbol sequence;
and

means for transmitting the spread combined symbol sequence,

wherein the spread combined symbol sequence to
15 be transmitted has a plurality of slots, and
said receiving processor comprising:

means for receiving the spread combined symbol sequence;

means for generating the combined symbol
20 sequence by despreding the spread combined symbol sequence;

means for locating the pilot symbols in the combined symbol sequence;

means for generating pilot blocks by extracting
25 the pilot symbols from two or more slots in the combined symbol sequence in accordance with a

located result;

means for obtaining channel estimates of the data symbols by calculating a weighted sum of averages of the pilot symbols in the individual
5 pilot blocks;

means for obtaining a data symbol sequence by eliminating the pilot symbols from the combined symbol sequence in accordance with the located result;

10 means for compensating for channel fluctuations in the data symbol sequence by using the channel estimates of the data symbols; and

means for generating the data sequence by demodulating the data symbol sequence compensated
15 for,

wherein a magnitude of weighting differs between at least two data symbols in each slot.

4. The CDMA transceiver as claimed in claim 3,
20 wherein said transmitting processor further comprises means for inserting into the data symbol sequence a power control symbol sequence for controlling power of the data symbols and pilot symbols.

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5. The CDMA transceiver as claimed in claim 4,

wherein said receiving processor further comprises means for measuring from the pilot symbols a signal-to-noise and interference power ratio, and for generating the power control symbol sequence from
5 the signal-to-noise and interference power ratio.

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6. The CDMA transceiver as claimed in any one of claims 3-5, wherein said receiving processor further comprises means for extracting, from the data symbol
10 sequence compensated for, the power control symbol sequence for controlling power of the data symbols and pilot symbols, and said means for transmitting the spread combined symbol sequence transmits the spread combined symbol sequence in accordance with
15 the power control symbol sequence.

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7. The equipment as claimed in any one of claims 1-6, wherein the power of the data symbols and pilot symbols is controlled on a slot by slot basis.
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8. The equipment as claimed in any one of claims 1-7, wherein the number of data symbols included in each slot of the combined symbol sequence is the same, and the number of pilot symbols included in
25 each slot of the combined symbol sequence is the same.

9. The equipment as claimed in any one of claims 1-8, wherein the pilot blocks each consist of all the pilot symbols in each slot.

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10. The equipment as claimed in any one of claims 1-9, wherein when obtaining the channel estimates of the data symbols in an n th slot in the combined symbol sequence, where n is an integer, the pilot

10 blocks are generated from $(n-K+1)$ th slot to $(n+K)$ th slot in the combined symbol sequence, where K is a natural number.

11. The equipment as claimed in any one of claims 1-10, wherein the pilot blocks closer to the data symbol with which the channel estimate is to be obtained have a greater weight.

12. A channel estimation method of obtaining channel estimates of data symbols from pilot symbols in a combined symbol sequence which has a plurality of slots and includes the data symbols and the pilot symbols, said channel estimation method comprising the steps of:

25 locating the pilot symbols in the combined symbol sequence;

generating pilot blocks by extracting the pilot symbols from two or more slots in the combined symbol sequence in accordance with a located result; and

5 obtaining the channel estimates of the data symbols by calculating a weighted sum of averages of the pilot symbols in the individual pilot blocks, wherein a magnitude of weighting differs between at least two data symbols in each slot.

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13. A CDMA receiving method of generating a data sequence by receiving a combined symbol sequence that has a plurality of slots, includes data symbols and pilot symbols, and is spread, said CDMA

15 receiving method comprising the steps of:

receiving the spread combined symbol sequence;
generating the combined symbol sequence by despread the spread combined symbol sequence;
locating the pilot symbols in the combined
20 symbol sequence;

generating pilot blocks by extracting the pilot symbols from two or more slots in the combined symbol sequence in accordance with a located result;

obtaining channel estimates of the data symbols
25 by calculating a weighted sum of averages of the pilot symbols in the individual pilot blocks;

obtaining a data symbol sequence by eliminating the pilot symbols from the combined symbol sequence in accordance with the located result;

compensating for channel fluctuations in the
5 data symbol sequence by using the channel estimates of the data symbols; and

generating the data sequence by demodulating the data symbol sequence compensated for,

wherein a magnitude of weighting differs between
10 at least two data symbols in each slot.

14. A CDMA transmitting and receiving method comprising the steps of:

on a transmitting side,

15 generating a data symbol sequence by modulating a data sequence;

generating a combined symbol sequence by inserting pilot symbols into the data symbol sequence;

20 generating a spread combined symbol sequence by spreading the combined symbol sequence; and

transmitting the spread combined symbol sequence,

wherein the spread combined symbol sequence to
25 be transmitted has a plurality of slots, and on a receiving side,

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receiving the spread combined symbol sequence;
generating the combined symbol sequence by
despreading the spread combined symbol sequence;
locating the pilot symbols in the combined
5 symbol sequence;

generating pilot blocks by extracting the pilot
symbols from two or more slots in the combined
symbol sequence in accordance with a located result;

obtaining channel estimates of the data symbols
10 by calculating a weighted sum of averages of the
pilot symbols in the individual pilot blocks;

obtaining a data symbol sequence by eliminating
the pilot symbols from the combined symbol sequence
in accordance with the located result;

15 compensating for channel fluctuations in the
data symbol sequence by using the channel estimates
of the data symbols; and

generating the data sequence by demodulating the
data symbol sequence compensated for,

20 wherein a magnitude of weighting differs between
at least two data symbols in each slot.